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GOMPHAESCHNA OBLIQUA SPEC. NOV., A NEW SPECIES OF GOMPHAESCHNINAE FROM THE LOWER CRETACEOUS OF NORTHEASTERN BRAZIL (ANISOPTERA: AESHNIDAE)

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The new sp. is described and figured from a single ♀, recovered from the Crato member of the Lower Cretaceous (Aptian) Santana formation. The holotype is deposited in the AMNH. Herewith the presence of the subfamily is established in the Americas prior to the separation of the continents. This is the oldest known American gomphaeschnine, confirming the primitive status of *Gomphaeschna* and its evolution toward simpler venation.

INTRODUCTION

Some years ago, a large fossil insect assemblage was collected by unknown persons from the Crato member of the Lower Cretaceous (Aptian) Santana formation, located near Nova Olinda, East North East of Juazeiro do Norte 39° 45'W, 7° 10'S, in the interior of northeastern Brazil. The assemblage was kindly donated to the American Museum of Natural History by Dr Herbert R. Axelrod of Neptune, New Jersey.

This paper describes the adult of a new *Gomphaeschna* species included in this assemblage, and comments on the significance of the new evidence in terms of the phylogenetic considerations advanced earlier by WIGHTON & WILSON (1986).

GEOLOGY AND PALAEOECOLOGY

MABOSOONE & TINOCO (1973) described the Crato member as being the lower of three members comprising the fossiliferous Santana formation, best known for its rich association of fishes, and is the remnant of an intracontinental sedimentary basin originating during the Jurassic-

-Middle Cretaceous reactivation stage of the Brazilian shield. The 50 m thick Crato member consists of a quartzose clastic limestone base with a series of thin laminated limestone and silty shale layers.

The dragonflies, along with many other undescribed adult and immature insects, inhabited a low-energy shallow fresh-water environment, with gradual deposition under anerobic conditions and a warm climate. Within the clayey layers of the Crato formation are found poorly preserved plant remains, elongate forms of pollen possibly belonging to the Gnatales, conchostracans resembling *Bairdestheria,* mollusks of the family Unionidae, and several genera of Ostracoda. Fish species from the Crato member are all of small size and consist of *Cladocyclus, Dastilbe, Leptolepis* and *Tharrhais.*

GOMPHAESCHNA OBLIQUA SPEC. NOV.

Figures 1-2

Material — **Holotype** ♀: AMNH (American Museum of Natural History Invertebrate Department Collections) 43257, part only, adult ♀ with both hind wings and remnants of the thoracic region.

Horizon and type locality — Crato member, Santana Formation, L. Cretaceous (Aptian), near Nova Olinda northeastern Brazil. Collector and date of collection unknown.

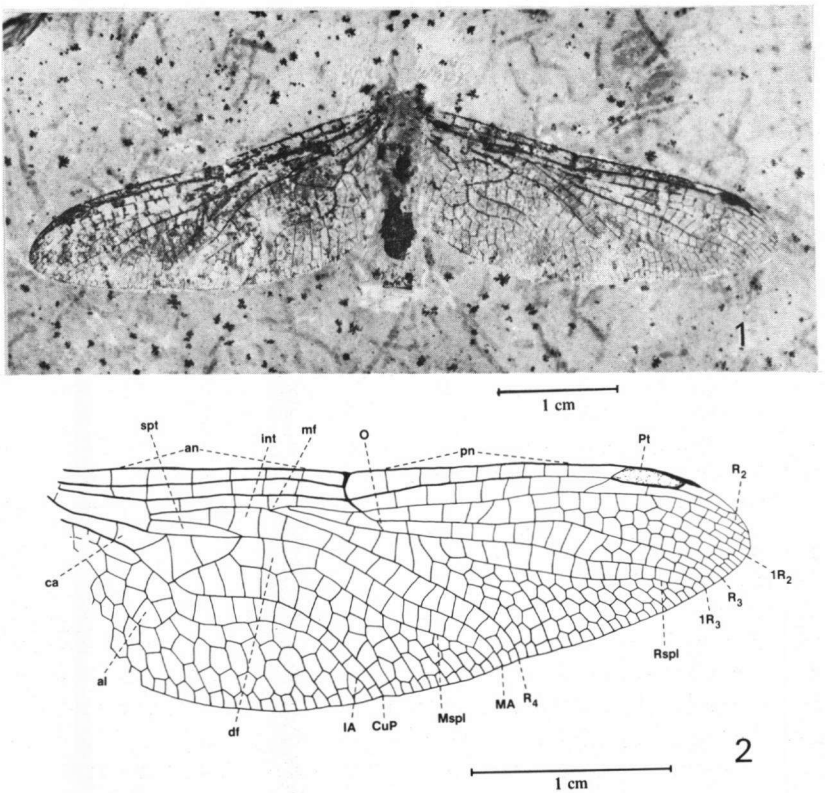
Etymology — Latinized form of oblique after the distinct slanting vein which forms the fourth cell distal from the nodus between R2 and R3.

Description — Hind wing length 34 mm, width at the nodus 11 mm. The hind wings are hyaline and display all of the subfamilial and generic diagnostic characters of the genus used by WIGHTON & WILSON (1986): anal loop (al) with five cells; no supplemental anal loop; Mspl present; Rspl well developed; basal discoidal field (df) with two rows of cells; CuP and 1A separated by one row of cells; one cubito-anal (ca) crossvein; oblique vein (o) near subnodus; R4 and MA parallel as they approach the wing margin; no crossveins in supratriangle (spt); three intermedian (int) crossveins proximal to apex of middle fork (mf); one cell row separating MA from Mspl; IR3 not symmetrically forked. In addition, the pterostigma (Pt) subtends one and one half cells.

Affinities — The hind wings differ from those of the extant *Gomphaeschna furcillata* (Say) and *G. antilope* (Hagen) as follows: antenodal (an) crossveins 6/6 and postnodal (pn) crossveins 8/7; IR2 well developed, R2 separated from R3 by a maximum of seven cell rows; CuP separated from posterior wing margin by a maximum of five cell rows; slanting vein between R2 and R3 forming the fourth cell distal from the nodus; somewhat denser venation. Differs from the Lower Cretaceous *G. inferna* PRITYKINA (1980) in having seven cell rows between R2 and R3; IR2 well developed; two cell rows between R3 and IR3; slanting vein between R2 and R3 forming the fourth cell distal from the nodus.

Remarks — Unfortunately, the counterpart which might have yielded the fore wings was not collected. Hence the distinctive comparison of the fore and hindwing triangles cannot be made.

The geologic age, collection locality and somewhat denser venation of this



Figs 1-2. *Gomphaeschna obliqua* sp. n., holotype (AMNH 43257), adult ♀ with both hind wings and remnants of the thoracic region (Crato formation northeastern Brazil): (1) photograph of specimen; — (2) composite camera-lucida drawing of both hind wings.

species support the following tentative conclusions of WIGHTON & WILSON (1986):

(1) The genus *Gomphaeschna* is the most primitive living gomphaeschnine which could have undergone some reversals as a consequence of evolution toward simpler venation.

(2) The subfamily is geologically old, was relatively diverse during the Cretaceous, and originated at a time when many of the continents that are now separated were still joined together.

The discovery of *G. obliqua* sp. n. also indicates that this is the oldest gomphaeschnine genus in the Americas, occurring there since the Early Creataceous times, as predicted by WIGHTON & WILSON (1986).

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